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THE SUPPOSED REMEDIES FOR SNAKE BITES.

By P. L. SIMMONDS.

I am glad to find that the subject which I opened up a month or two ago on snakes, and the supposed remedies for snake bites, is leading to experimental researches and discussions which are so calculated to elicit some degree of useful information. Whether looked at in a selfish or in a philanthropic point of view, it will be interesting to very many persons resident abroad, and to some of the Societies in Union. It is impossible, in countries where snakes are common, to say how soon a snake-bite may call upon individuals, either for themselves or their neighbours, to make use of such appliances as they have heard to be efficacious under similar circumstances. The subject, as Judge Temple observes, is "one of paramount importance to all those whose destiny leads them to pass much of their time amongst the jungles of India or the dense forests of Central America."

Much confusion has arisen from the common name of snake-root given to the roots of several plants, and it is often difficult to ascertain whether the name has been applied from any supposed beneficial properties as an antidote, or merely from the contortions and convolutions of the roots.

There seems to be a prevalent idea among medical men generally, that there is no specific, particularly in the vegetable kingdom, against the bite of venomous snakes; and to such an extent did Fontana carry his prejudice, that, on hearing of a cure effected in London, by Dr. Mead, of a man who was bitten by a rattlesnake, he said, "The rattlesnake might have been destitute of venom; it might have bitten superficially, and so ill, that the poison introduced was not in sufficient quantity to occasion death; a vein or artery, torn by its tooth, might have forced out all the poison, or a part of it." Such reasoning could only come from a man determined not to be convinced. The wiser plan, surely, is to be prepared, in case of necessity, with such means as have been well recommended.

When we know of such powerful vegetable products as manchineel, hemlock, aconite, opium, nux-vomica, upas or antjas, tanghinia, henbane, datura, belladonna, and croton, with many others, I think we may, without encouraging very whimsical notions, fairly hope to find some specific amongst vegetables, even against the direful and sudden effects produced by snake-bites.

In Ceylon the leaves and roots of the *Croton tiglium* are applied internally by the natives in cases of snake-bites. The *Aristolochia Indica* is also used in cases of venomous stings. The Virginian snake-root, or butter-wort (*Aristolochia serpentaria*), was once much used to cure the bite of venomous serpents, and great confidence was placed in it. From this circumstance it has derived its name, but, at the present day, it has lost its reputation,

and is seldom or ever used. The root of *Liatris spicata*, known as "the button-snake-root," and "rattlesnake's master," when bruised, is, in America, applied externally for snake-bites, and a decoction of it drunk freely. There is another button-snake-root, the *Eryngium aquaticum* of the United States Pharmacopœia.

It is generally believed, by natives of India, that the seeds of *strychnos nux vomica*, habitually taken in small doses, will prove a safeguard against the poisonous effects of snake-bites. The bark of the tree is given with *aristolochia*, and with an undefined plant, named by the natives *Nargina pusjum*, in the cachectic state produced by the bite of poisonous snakes, after the first symptoms are relieved. Diet requires attention; oils and acids must be avoided during its use.

In the catalogue of the Madras Exhibition, mention is made of another plant similarly used, but only the native names are given. The Canarese name being Ankolay Beejan, the Tamil, Allingie Verei. The kernels, bruised and fried in castor oil, are said to be applied to the eyes, as a stimulant to raise the system from the coma produced by snake-bites.

Piso, in his account of the snakes of Brazil, mentions the root of the jurubeba plant as being efficacious in curing the bites of snakes. It is stated to be a small shrub, which bears a fruit resembling the potato apple. The difficulty in all these cases is the identification of the plant, from the absence of any botanical name or description.

The black snake-root, or *Cohosh Cimicifuga racemosa*, is also sold by herbalists under the name of rattlesnake-root, but more from its contorted form than, I believe, from any properties it possesses as an antidote or curative.

The sudorific sub-aromatic roots of *Scorzonera hispanica* (Linnaeus), are believed by the Spaniards to be a specific against snake-bites, and hence the plant bears the common name of viper's grass. A decoction of the root of *Indigo fera anil*, in conjunction with some kind of grass root and black pepper, is considered useful in the East, in the state of cachexia produced by snake-bites.

Dr. Elliott, of Ceylon, in his paper, the *Columbo Observer*, commenting upon a death from the bite of a snake recently, gives the following information and advice:—

"The snake's tooth, like the cat's claw, does not penetrate deeply—and for the same reason, both being loose in the socket, in order that the hold may be easily abandoned at any moment. Were either fixed at the root it would penetrate deeply and be frequently broken. For this reason the snake's tooth merely scrapes the surface, and therefore the part is easily cut out without the slightest danger. For this purpose it is only necessary to pinch up the skin between the finger and thumb, and cut off with a pen-knife, razor, or table-knife, a piece about the size of a six-pence. We have frequently explained that this may be done on any part of the body without the slightest apprehension of danger, as no blood vessel of any consequence can be injured by such a wound in any part of the body whatever. The idea of hemorrhage from the cut, as well as the utter uselessness of internal medicines should be dismissed from the mind; and the perfect safety and success of cutting out a piece of skin be impressed upon the memory.

"It so happened that a few nights after the above mentioned death was related to us, a horsekeeper, who had been bitten in the foot by a snake, was brought to our door. The pain was most intense, and, as usual, gradually passing up the limb; but no mark whatever of the bite could be seen, which is not unfrequently the case in the dark skin, especially at night. He pointed as nearly as he could (for the sensation in the part is for the time destroyed) to the spot, which was on the side of the small toe. A piece of skin about the size of a four-pence was cut out—an operation which gave him no pain whatever—that is he did not feel the pain of the cutting—a circumstance we have almost invariably

noticed in these cases, and which ought to remove any reluctance there might be in resorting to the knife. In a few minutes the pain began to descend along the limb, until the expiration of perhaps ten minutes, when it entirely subsided; and then, but not till then, did the pain of the cut become perceptible. This too is a most interesting fact, and accords with our experience in almost all cases; so long as the poison remains the pain from the cut is not felt; the latter being perceived only on the subsidence of the former; and when this takes place it is the signal that all danger has passed. The course is generally as follows: Intense pain is at first experienced at the seat of the bite, but in a few minutes it begins to ascend the limb, until the lapse of half or three quarters of an hour, when it has reached the loins, if the bite be on the leg, or the neck if on the hand. The piece is then cut out without being felt, and within a few minutes the pain commences to leave the upper parts, gradually descending along the limb until it reaches the wound, when the cut begins to be felt.

"The relief of intense pain would alone justify the cutting out a piece of skin the size of a sixpence; but surely the conviction that life or death is the alternative will nerve the most timid to perform such a trifling operation."

The following communication by Dr. Cameron, was addressed to the Superintending Surgeon at Kurrachee, regarding a cure for snake bites:

"Being aware how much public attention has been excited of late in this Province, from the frequent deaths caused by snake bites, and being quite alive to the great importance of the subject, it affords me much pleasure to forward the accompanying statement of successful termination to a snake bite, that has lately come under my notice, together with a few observations that I venture to offer on the subject, which I do with much diffidence, but with a sincere desire that they may be of benefit. I also hope that the statement forwarded may be the means of shewing that a person so bitten need not by any means despair, but rather be led to use the remedial measures pointed out, and which, I trust, may be the means of saving human life.

"In forwarding the snake called 'Kuppa,' that inflicted the wound, I regret not having had an opportunity of examining its head, which was destroyed when it was killed; Captain Jameson, Deputy Collector of Nowshera however, at once recognized it as being of a kind whose bite caused numerous deaths in his own Collectorate, and throughout Sind, and says, that it is of the most poisonous kind.

"On the 12th September, 1855, at 4 o'clock p.m., Nursoo, Commissariat cart driver, was brought to the Artillery Hospital, stating that he had been bitten by a snake hardly five minutes previously, in one of his fingers. Mr. Rourke, the assistant-apothecary, on examination, found two punctured marks near the end of the little finger on his left hand. On my arrival at the Hospital a few minutes afterwards, I saw the man, and the snake that inflicted the wound was pointed out to me. I found that Mr. Rourke had most judiciously lanced the punctured wounds, laying them open, and causing them to bleed freely, and was washing the scarified parts with warm water. This having been done, I made the man put his mouth to the wounded part, and told him to suck as vigorously as possible; this was continued for upwards of an hour, during which he had occasional doses of ammonia. The wounds were then covered over with a paste made of Pulvis Ipecacuanha. I appointed people to sit up with him by turns all night, desiring that I might be made acquainted should he become at all worse. No bad symptom, however, supervened, and when I saw him next morning he said, beyond his finger that side of his hand and arm feeling rather benumbed, he was quite comfortable, and he left hospital during the day well.

"In the foregoing, by scarifying the puncture and causing it to bleed freely, two objects are attained; first,

that by the local bleeding, the absorption of the virus into the system is rendered less rapid, while the flowing of the blood may remove some of the virus itself that has been injected into the wound, besides which, it, by this means, is enlarged, rendering it less difficult to wash the puncture, which is the next thing that should be done. After the wound has been well and expeditiously washed, the mouth, which in this instance acts the part of a cupping glass, with this beneficial difference, that it can suit itself to every part, as in the case adduced above, when the finger was the part bitten, while the cupping glass can only be applied to certain parts. I have said the wound having been well and expeditiously washed, the mouth should be applied and suction vigorously carried on, and prolonged according to the virulence of the poison of the snake that has inflicted the wound, for one, two, and even three hours, without ceasing, by relays of people, who are to be directed to spit out what they draw into their mouth. While upon this part of the subject, it may be as well to mention, for general information, (as I am aware that a contrary idea is prevalent, and, indeed, it is natural that it should be so) that the virus of a snake, however deadly, when injected through the skin, by means of its tubular fang, is harmless, even when swallowed and taken into the stomach. The only danger to be apprehended by the suction of the poison into the mouth, being, the chance of an abrasion of the gums. This fact cannot attain too great publicity, as it will remove the objections of bystanders to render that assistance, which if they considered dangerous to themselves, they naturally would refuse to afford.

With regard to the process itself, that of continued suction by the mouth, I feel I cannot say too much in its favour, as I consider that if it is had recourse to in time, even in the absence of scarifying and washing the puncture, not one death in a hundred would occur from snake bite, while from its easiness of attainment, and simplicity in the mode of using, it is within the reach of all. In the first place the virus is directly abstracted from the wound, while, at the same time, pressure is made around it by the action of the lips during the process of suction, preventing the absorbents from taking up the poison, and conveying it into the system; two important objects being thus at once attained.

So much value do I place upon what I thus advocate, that when bitten by a whip snake myself, some years since, above the heel, and being asked by two friends who were present, what should be done, I told them, saying that I could not get at the place myself to apply my mouth to it. They, however, at once offered their kind assistance, and continued in relieving each other for upwards of two hours, to which, under Providence, I consider I am indebted for my life. I observe that this continued suction causes, after a time, great pain to the patient, and probably he will (as I did) beg that it may be put a stop to; no attention, however, should be paid to this, it should be continued for a time, as I have already mentioned, dependent upon the virulence of the poison possessed by the snake that inflicted the wound, and the length of time that has elapsed from the time of being bitten, before it has been commenced. In conclusion I have only to add that diffusible stimulants should from time to time be administered, the quantity of which will depend upon the state of the pulse; and the attention of the wounded person is to be kept excited as much as possible, and every means, even that of making him run about, being used to prevent him from falling asleep for some hours after he has been bitten.

The Academy of Sciences of Paris, December 5th, 1854, speaks in the most favourable terms of a paper read by Dr. Brainerd, President of the Rush Medical College of Chicago, on the treatment of bites of enormous serpents. He caused pigeons to be bitten by the *Crotalophorus trigeminus*, and saved them by injecting solutions of lactate of iron and iodine of potassium—both electro-positive

salts—into the wounds. Now it is an undeniable fact that “prevention is always better than cure,” and whoever, therefore, discovers the means of shielding from any of the physical and moral evils that afflict humanity, merits better the gratitude of his fellow-men, than he who points out to us a certain cure. Here philosophy and benevolence go hand in hand, impelled, doubtless, by a similar idea. Serving out quinine in wine to our gallant sailors, who expose their lives on the swampy regions of the West Coast of Africa, to put an end to that chronic evil, the African slave trade, has, with scarcely any exceptions, prevented attacks of fever; on the contrary all those who refused to take this *preventive* medicine were affected by the *malaria*, and some died. A similar plan is adopted by the native snake doctors and catchers, they keep the system saturated with some bitter decoction, preferring, I believe, certain species of *aristolochia*, *guaco*, and *cedron*. However, this is a very disagreeable alternative by which to purchase immunity from an accident which, after all, may never befall us, besides affecting more or less the healthy state of him who would submit to being cured beforehand, as they style the process. A correspondent in Chiriqui, says, “The following anecdote, related to me by a very intelligent native here, would point out to us a better mode of investigation. A large snake of the most venomous kind was caught in a hen roost, trying to steal the eggs on which a hen was sitting, after having killed the hen, whose cackling had betrayed the thief. The farmer having heard from the Indians of the repugnance which these reptiles have for an alligator’s tooth, had one brought and tied round a hen’s neck, and thus thrown to the snake; it remained unhurt. The fowl was again taken up and the tooth removed; when thus thrown in the reach of the snake, it “immediately bit, and the bite, of course, was mortal. The experiment was again repeated with the same results.” I have often been informed that a reptile’s tooth presented to a snake has a sort of magnetic influence over it, causing the snake, even when irritated, to become as if torpid. It is a common assertion among the country people that the presence of a pregnant woman has a somewhat similar effect. Now, as to the *modus operandi* of the former, we can only suppose it is owing to the negative or non-electric condition of the fangs, which when rubbed attracts light substances, just in the same way that amber does. That poisons introduced into the body act more or less by disturbing the electro-vital electricity which exists in the state of health, we have a confirmation in the experiment of Dr. Page, of Valparaiso, who employed the electro-magnetic battery to resist the prostration ensuing from large doses of opium. M. Ducloux has also shown that the tetanic symptoms produced by overdoses of strychnine are relieved by *negative* and rendered worse by positive electricity. The *cedron* having more or less a principal similar if not identical with strychnine, must, therefore, be useful in snake bites from its positive exciting qualities. However, what we ask from science is rather the *amulet* to protect than the means of cure, which, though certain, can only be after immense suffering and danger. Having thrown out the suggestion like “bread on the waters,” I hope some of your scientific benevolent readers will be enabled to confer so useful a boon upon the industrious emigrant and others, who go to bring new lands within the domain of cultivation.

The point of the Bushman’s arrow is saturated with a deadly poison, supposed to be made of the venom of snakes mixed with the milky juice of the *Euphorbia* and of some poisonous bulb. As a prevention against the ill effects of venomous snakes, many of the Hottentots and Bushmen swallow the venom of these reptiles with the view of saturating their system with it, and so rendering any casual introduction of the same venom innocuous. The curative means they adopt for venomous bites and poisoned wounds, consist of internal and topical use of snake root, the outer bark of which possesses a slightly sweetish

taste, the fibres of the wood being yellow, and imparting an acid and somewhat hot flavour.

The mode of using this remedy is by the wounded person chewing a portion of the root until it becomes a pulpy mass, and swallowing the saliva to produce nausea. The wound is also washed with some of the saliva, and the pulp bound upon the part. This is frequently repeated until the patient is out of danger. The most implicit faith appears to be placed in this remedy.

Dr. Orpen, of Colesburg, Cape of Good Hope, tells us that though the full introduction of the poison into the blood will kill in a few hours, yet it can be sucked into the mouth, either of the person bitten, or of another, and even swallowed, with perfect impunity. This, all the Bush people know well and practise. Secondly, if it be possible, from the position of the wound, as on the fingers, toes, arms, or legs, they should tie at once on receiving the wound, a cord of some kind round the part above the wound, very tightly, twisting it with a stick, so as to prevent wholly, or at least diminish the quantity of the poison that can be carried by the veins towards the heart, and into the general circulation. Let the person who sucks the wound continue to do so, spitting out, if he chooses, as most will, whatever he can extract of blood or poison, until he can suck out no more; and if the wound be so situated that it does not bleed freely in sucking, it may be advisable to enlarge it, by a simple cut with a knife, which almost every one carries, so as to make more blood flow out under the suction. If the wound be so placed that it can be cauterised with a red-hot iron, or with any powerful caustic, let this be done to its whole depth, as soon after the tying of the handkerchief (or cord) and completed sucking, as possible.

It is said, that in India a small poultice of *ipecacuanha* powder is applied to the wound efficaciously, and it is also administered internally; so also are various preparations of ammonia (eau-de-luce, spirits of hartshorn, liquid and solid smelling salts), &c., &c. There can be no objection to try anything that either experience or theory shows to be really or probably useful; but all these things, as well as surgical instruments, are rarely at hand when the mischief occurs, or to be obtained until after all chance of escape from death is gone; whereas there will be always present the bitten person’s own mouth to suck any part that his lips can reach, or commonly also some other person’s mouth, to do the same office to parts out of his own reach; and at almost all times some kind of band, ligature, cord, handkerchief, &c., is within reach in a moment, and these two means, I believe, give more rational prospect of escape than all other measures united. I have been told, that the Bushmen harden themselves gradually against the effects of the bites of poisonous snakes, by drinking all sorts of animal and vegetable poisons, and say they have no fear of any such. Whether there be any truth in this story, or this boast, or efficacy in this practice, I cannot say, but I do not believe there is; because all such poisons, if they do not kill by their direct action on the stomach (which snake’s poison will not, though many vegetable and mineral poisons will), must become so wholly altered, chemically, by digestion, as to have no effect when they reach the blood. It is certainly said in history, that Mithridates, King of Pontus, the great enemy and almost victor over the Romans, had hardened himself against all poisons, by the constant use of them; and there is a medicine called after his name, from this tradition; but the fact is as uncertain as a thousand others traditionally related.

At a meeting of the Medico-Chirurgical Society of Graham’s Town (Cape Colony), held Sept. 25th, 1855, the President, Dr. Melvin, Inspector-General, quoted some experiments on snake-bites, which had been undertaken by a medical officer, solely for his own information and satisfaction:—

EXPERIMENT 1.—A large cobra de capella, of the yellow description, was induced to bite a full-grown dog

in the neck, below the right ear. At the moment the animal was bitten he evinced much terror, and uttered a yell, but did not afterwards exhibit any symptoms indicative of suffering, except occasionally a slight twisting of the ear: after ten minutes the part appeared somewhat swollen, and the dog became lethargic; at the expiration of eight minutes longer he was seized with universal tremor, after which he lay down, and could not be induced again to resume the standing posture. When placed on his legs his nose always rested on the ground, he being unable to raise his head, the extensor muscles of the neck having to all appearance lost their power; and this defect of muscular energy gradually pervaded the whole body; he lay for some time in a state of coma, but at the expiration of 30 minutes from the infliction of the wound he was seized with strong convulsions of the body, his eyes being open and fixed. The paroxysms returned at short intervals during fifteen minutes, when, at the termination of one, he expired, making a total of forty-five minutes from the moment he was bitten. On examination, immediately after death, there was evident tumefaction around the wound, the cellular membrane being filled with serous fluid of a dark colour, which also could be traced downwards along the course of the absorbents in the neck; the venous system was loaded with blood, which appeared to be attenuated, and retained its fluidity during many hours. Except turgescence of the vessels of the brain and lungs, particularly of the veins, there was not any morbid change in the vital organs observable.

EXPERIMENT 2.—Two days after the above experiment was made, the snake bit a full-grown dog in the shoulder. The same indications of terror and pain as in the foregoing instance were afforded, and afterwards the animal did not evince any uneasiness or annoyance from the wound. Five minutes were permitted to elapse, when a portion of the integuments and subjacent parts, to the distance of two inches round the bite, was removed, after which he was allowed to lick the surface. The dog was kept up until the following day, when, not having shown any symptoms of being affected by the venom, he was released, and he became perfectly well.

On examining a portion of the integument which had been excised, appearances similar to those remarked in the former experiment were observed to extend round the bite. As a corroborative proof that the cobra had sufficient energy and virus to infect this dog, the third experiment was practised by causing it immediately to fasten on a cat, which died in fifty-six minutes afterwards, having symptoms and appearances, on dissection, exactly similar to those detailed in the first case.

EXPERIMENT 4.—In order to try the efficacy of the "snake root," a full-sized bastard cobra was induced to fasten on a dog at the lower part of the neck. After a lapse of five minutes a strong infusion of the root was poured down his throat until vomiting was produced, and this was thrice repeated; the wound was washed with it, and some of the bruised root was bound on the part. At the expiration of twenty minutes, the animal became restless and whined; soon after, a lethargic insensibility seized him: convulsions supervened and terminated in death, in little more than an hour from the infliction of the bite. The *post-mortem* appearances in this case were similar to those already described, the effusion of serum around the wound being rather more copious than in former instances.

In two instances, the experiment of excision was tried. In one, seven minutes were allowed to elapse previous to the operation; and in the second, the part was not excised before a quarter of an hour had elapsed. The former of these cases terminated favourably; but in the other the same result followed as if no curative means had been adopted.

From a due consideration of the several experiments quoted by Dr. Melvin, he is inclined to regard excision of the part bitten by a venomous reptile as the surest

means to be adopted to save the sufferer's life; and the operation should not be delayed beyond ten minutes after the infliction of the wound. Suction by the mouth is a well-known remedy, and the readiest which can be adopted, and will arrest the absorption of the virus for a time, but it is doubtful that it would remove the whole of the poison: it would lessen the quantity, however, and make what remained less noxious. The application of cupping glasses would be more powerful and efficient; but at a distance from a house such articles could not be procured. Under such circumstances, the writer thinks that suction, and the application of a ligature immediately above the bite, would be the readiest and only means to be adopted, until excision could be effected. Stimulants are of great use, particularly the carbonate of ammonia. Arsenic has also been used with success.

Mr. Theobald, an apothecary of Kamptee, Madras, publishes what he considers an effectual remedy for the sting of the scorpion, which is the juice of the *Achyranthes aspera*, a plant common everywhere in India. He states, "My daughter was three years of age when she was stung in one of her hands by a scorpion, as she attempted to catch it as it was crossing her, and only her mother, who was present, noticed the occurrence accidentally: the little sufferer could not point out where the sting was, and her incessant screams were so great that I was fearful of her falling into convulsions if she was not immediately relieved. Having lost the prospect of touching the affected part with nitric acid, for want of knowing the exact situation of the sting; and the awful consequences that might follow if her hands were besmeared with a destructive fluid, led me to resort to something that I should not feel regret for having adopted. The fresh leaves of the plant named were bruised and applied all over the fore arm, and about a table spoonful of the juice given internally. This had the desired effect in arresting the pain in a very short time. He subsequently tried the remedy on his gardener with equal success.

Mr. W. J. Carter, clerk of the Church of Kamptee, also publishes a letter notifying the efficacy of the remedy in the case of a child of his stung by a scorpion. The leaves were pounded, three spoonfuls of the juice were given internally, and from the uncertainty as to which foot was stung, the juice was also applied to both feet up to the knees. The child was relieved in a quarter of an hour.

Another correspondent suggests as an effectual remedy well rubbing the part affected before the fire with gingely oil (*Sesame*).

The cure resorted to in New South Wales is to take a pinch of salts of hartshorn, and put it on the bite, then apply a few drops of nitric acid, which may be removed in a few minutes if it does not succeed in relieving the pain.

The following hints, given in the *Cape Almanac*, are worth attending to, as summarising in brief much of the advice given already:—

"In the event of a person being bit by a snake, no time should be lost in applying the proper remedies. The indications of cure should be three—1st, In preventing the poison entering into the constitution of the body; 2nd, The withdrawing or destroying the poison in the wound; 3rd, The counteracting its baneful effects when it has entered the system.—The first of these is to be effected by tying a very tight ligature, or garter twisted with a stick, above the wound about five or six inches, or over the first joint of the limbs; by these means the poisonous liquid may be prevented entering the circulation.

"The second indication is that of applying topical remedies to the wound, either by the application of one's own mouth, or that of an assistant, for the purpose of withdrawing, by strong suction, as much of the poison from the wound as can be effected, and which will do no injury, either to the mouth or stomach of a person if

swallowed; after which eau de luce, nitric or sulphuric acid, water of ammonia, or sal volatile, should be dropped into the wound as freely as possible, and the recess washed as completely out with it as can be accomplished.

"The third indication is to be effected by exhibiting internally a tea-spoonful of eau de luce, water of ammonia, or sal volatile, in half a glass of cold water, every five minutes, to create a strong and artificial stimulus, and thus to remove the languor and lethargy that immediately succeed the bite; further, by rubbing harts-horn on the temples and nostrils, by employing bleeding and electricity, and occasionally brandy, both externally and internally, with frictions of salt, and increased temperature of heat and blankets; all those exciting means should be employed until the patient recovers, or until no further hopes are entertained of his recovery. The great object of these applications is to support the *vis vitæ*, or power of life, until the constitution, either by its own energy, has overcome the effects of the imbibed poison, or the remedies exhibited, by mingling with it in the puncture, or meeting it in the circulation, may render it, by decomposition, inert or harmless. In discontinuing the remedies that have been recommended, a course of gradual diminution should be pursued, as they are apt to occasion, by their effects, a considerable degree of debility."

In a paper on the medicinal properties of the *Mitana Guaco*, which I published in the *Pharmaceutical Journal* a few years ago (vol. 10, p. 534), I cited various authorities as to its preventive virtues against all poisons. The celebrated Mutis, of Santa Fe, first made known its properties as an antidote against the bite of certain serpents, and Humboldt and Bompland have confirmed the powerful virtues of the plant. M. Mutis was desirous of ascertaining if inoculation with the guaco would render a person obnoxious to the bite of serpents for a lengthened period, but was prevented from completing his experiments by the refusal of the Grand Court of Justice at Santa Fe, to allow him to make them on criminals condemned to death. The negroes who wish to protect themselves against snakes bites take the following precautions:—They make two incisions on the feet, two on the hands, and one on each side of the chest. They express the juice of the leaves of the guaco, which they pour on the incision, as if inoculating. Before the operation they make the patient drink two spoonfuls of the juice, and they recommend his doing the same five or six times a month to continue the virtues. One of the leaves of the plant is usually carried about the person, and the strong penetrating and venomous odour is said to have stupefying effect on the reptiles. [Alibert's *New Elements of Therapeutics*, p. 500.]

A very valuable paper by Capt. Munro, F.L.S., was published in the first part of the 6th vol. of the *Journal of the Agricultural and Horticultural Society of India*, on the antidotes to snake bites. The set of this Indian journal is in the Society's library. I transcribed the paper in full in my *Colonial Magazine*, Vol. XIII., p. 377. It is too long to be given here, but I will make an abstract of those parts specially relating to vegetable antidotes.

For many years past different remedies have been proposed in India as infallible ones, by men in several instances, entitled to full credit for completeness in carrying on their experiments, and possessed of a sufficient knowledge of the subject to render their assertions worthy of all belief and attention. Some of these remedies have, however, been tried by others equally capable of giving an opinion and found to fail.

I find these remarks have already extended to such length that I must defer the conclusion until a future number.

MEN AND MANUFACTURES IN THE UNITED STATES.

By W. BRIDGES ADAMS.

The object for which the Society of Arts was incorporated was "generally to assist in the advancement, development, and practical application of every department of science in connexion with the arts, manufactures, and commerce of the country."

Therefore, to know and understand the country and people with which and whom we have the largest commercial intercourse, is an important element in the operations of the Society.

We have been in the habit of considering and calling the people of the United States, Transatlantic Englishmen, because they were once our colonies. This alone, cannot make them Englishmen, in any other sense than that they use the English tongue, and have inherited many of the old English laws. Much more than this goes to the making of Englishmen—the quality and staple of manhood that originated those laws and that language, and continues to make spontaneous additions to them. We, and the original ruling people of the United States, who threw off the yoke of slavery sought to be imposed on white men, started from the same point. It would be ethnologically desirable to know what proportion of native born Englishmen and of native born Americans did the work at Bunker and elsewhere with mind and body. A difficult thing now to ascertain. But we can form some comparison as to how far Englishmen and Americans, starting from the same point, have kept parallel paths, and continue to resemble each other in laws, manners, and customs, physical appearance and bodily strength, as well as mental vigour; and if differences have grown up, we can try to analyse the causes of the difference.

The older naturalists, De Pauw and Buffon, writing at some period after the discovery of America, asserted that the new world produced both men and animals inferior to the European continent, and American philosophers contested the point. The European side of the argument was based on the fact that the larger European quadrupeds did not exist at the time of the conquest, and that the tribes of red men, whether by reason of inferior intellect or inferior bodily strength, or inferior industrial energy, were universally vanquished by the whites of Europe, whether coming from Spain, or France, or England, Portugal, or Holland.

Of these facts there could be no doubt; but the superiority of the Europeans might arise from superior and abundant means and appliances long known and practised. The Europeans might have passed through the phases in which they found the red men to exist; not a nation, but an aggregate of hunting tribes, who living, by the chase, when game became scarce, and population grew to a surplus, knew of no better remedy than slaughtering one another in war, with hereditary feuds, till their numbers were thinned down. A people taking no thought for the morrow, but not in the spirit of Christianity, and when the morrow came, seeking their food, if hungry, by the same processes as the wild beasts. Still this did not prove them to be either better or worse than Europeans might have been in some past age—they might be a younger nation, not come to their full growth.

But it is certain that from north to south, and from east to west, they possessed, with variations, one general physiognomy, whether as tall men in Patagonia, or as dwarfs in Peru, and moreover, that physiognomy, as evinced by the Aztec children lately exhibited, bore a strong resemblance to the Assyrians lately dug up by Mr. Layard. Be it what it might, there was assuredly some cause at work to produce this physiognomy, and that cause has not yet ceased to operate. It is probably a cognate cause to that which produces black men in Africa; Hindoos in India—thin and wiry and olive-coloured; Dutchmen in Holland—obese and fair and

lymphatic; Frenchmen in France—mercurial and belligerent, but toned down in Canada, and mingling freely with the red women, shunned by the English race; Irishmen in Ireland, with every tone of the voice an aspiration; Englishmen growing "more Irish than the Irish" within the "Pale," and Englishmen as they are and have been for ages, merging all foreign blood into their own peculiar form and temperament. It is not race that does all this, but something else. Races coming to England grow into Englishmen; Englishmen going to the United States grow into Americans. In India or the Antilles, though not Creoles born, they grow to resemble Creoles, and their descendants in Barbadoes, who boast of being neither "crab nor Creole, but true Bajuns born," have assuredly little trace of the Englishman left, save a deteriorated mother tongue.

The ancient Puritans of Massachusetts, albeit calling themselves Christians, invariably spelt the word *indian* without a capital letter, as something not human. Cooper and others have sought to chivalrise them to make up for it, but all the horses descended from Morocco barbs or Spanish *ginetes*, and stolen from Mexico to mount the Red men as Crows or Blackfeet, have failed to produce a Herbert or a Bayard. The churl by blood cannot grow up to knighthood without much crossing.

One of the best and clearest-brained men of America in the present day—one of the few to whom the revolutionary virtue and valour has descended—and who makes outward and visible signs thereof, Ralph Waldo Emerson, has visited us, talked to us, lectured to us, and written a book about us. He says in his book, "The Methodists have acquired a face, the Quakers a face, the Nuns a face."

True, all this. And even thus the Americans have acquired a face which very moderate perceptive faculties can pick out. This face Emerson himself possesses. It is a face suggestive of the red indigenous races of America, not of copper tinge, but sallow, indigenous in expression, indicative of melancholy temperament and nervous anxiety, a face which, notwithstanding, when brought into England, and acclimated during the term of an indenture of apprenticeship, changes its colour and becomes from sallow a healthy florid red. And *vice versa*, the healthy florid Englishman, taking up his abode in New York for a like seven years, becomes sallow, and acquires American characteristics when not counteracted by frequent sea-going. In Englishmen, hilarity is a constant quality. An American so rarely laughs that it is an object of instant remark by a stranger, "The laughs in New York are Irish." Englishmen get drunk. Americans drink drams, and invent names for them without end. Englishmen smoke pipes. Americans chew tobacco. Englishmen, between life and death, average 25 per cent. more working days than Americans, making a serious difference in the national capital invested in their "raising." Englishmen eat as a healthy pleasure; Americans as a matter of imperative business, to be rapidly done. Englishmen have an innate respect for law and order. Americans obey or break the law as best suits their impulses. Americans bush-fight with the rifle, as do the Indians. Englishmen stand up in phalanx, in "thin red line." The mind of the Englishman finds intervals of calm and enjoyment; the mind of the American is in a condition of constant fever—incessant strife—with intervals of prostration needing stimulus in "bitters and cocktails," which are effects not causes, and the fire-water to which the red races succumb is but the Indian version of the "juleps and slings" of the descendants of the imported white man.

The Americans are not a nation, not an indigenous growth of men. Since their revolution and before, America has been the recipient of people the surplus growth of all countries. They are an aggregated mass, living under laws as various as their separate States, and only held together by a general government, which they submit to more or less as it suits them. We cannot

verify, we can only speculate on what they would have been had immigration ceased with the revolution. Looking at the fact that boys leave their families and set up for themselves "on their own hook" at 15 years of age, and that the tomb-stones in New York diminish the "threescore and ten" of English life down to something like 45 and 50, we are constrained to suppose that soil and climate, marshy lands and hot summers, and cold winters, produce a hot-house growth of man, soon ripe, and quickly decayed.

That the American Union has made rapid progress in physical possession there can be no doubt. But food has been easy of acquisition, much easier than in England, and therefore there ought to be less recklessness of life. But the contrary is the case. Scarcely any people appear to be so reckless of life as the Americans. The Southern duels, and the Mississippi steam-boat drownings, and the barbarous deeds of Kansas, savour of people who feel life to be a weariness. In New Orleans it is said that to carry on business requires three partners—one to be killed in a duel, another to die of disease, and the third to pack up and carry off the plunder. And, again, they say that a man cannot well understand mercantile business till he has been three times broken up. Then States repudiate their debts, and it will be found that the repudiators are most common where the standard of life is lowest.

Englishmen are not remarkable for recklessness of life; they are ready to expend it for a great object, but not to throw it away in brawls. There was a period in English history—the plagues of London—when uncertainty of life begat recklessness of life, but it did not become perennial as in the United States.

But America does exhibit an outward energy in railways, ships, and manufactures, in commerce and invasion of neighbouring States, not national wars, but wars in which the surplus energy of the community can expend itself excitably if not profitably. In what class of people does this energy reside? In the native-born or in the imported races. There are American people on the northern seaboard of the Atlantic, who are very like Englishmen in their attributes, and it is quite clear that they make fast-sailing ships, stimulated by various circumstances, which heretofore, under the old navigation laws, Englishmen were lacking in, but the men who do these things are of the same staple as Englishmen; they have not deteriorated, on a Western bank of the Atlantic, from what their forefathers were on an Eastern.

"Through storm and wave and blinding mist, stout are the hearts which man
The fishing-smacks of Marblehead, the sea-boats of Cape Ann."

They invent, and so do Englishmen; but they have had a 'vantage-ground denied long to Englishmen. They had no impedimental laws of partnership, divorcing the brain and the purse; and for seven pounds sterling the inventor had his protection. They had no excise on glass, and they made imitation cut glass for half-a-century without an excise law to crush them; but it was Englishmen who made the first Crystal Palace for Americans to imitate, when the excise incubus was shaken off. They have excelled England in inventions in mechanical appliances to save farm and domestic labour—they have invented reaping machines, and washing machines, and apple parers, and wood-cutting and gun-making machinery, but all this was forced on them because wages were high and labour scarce. At works of necessity they are acute and striving; but for works of neatness they have little industry, and, considering their abundance of building material and comparative wealth, they are generally an exceedingly ill-lodged people.

Emerson says in his book, "The English, at the present day, have great vigour of body and endurance. Other countrymen look slight and undersized beside them, and invalids. They are bigger men than the

Americans. I suppose a hundred Englishmen, taken at random out of the street, would weigh a fourth more than so many Americans."

The artisans and seamen of the United States are, no doubt, native as well as imported. But who are the Fillibusters; and of whom were the rank and file composed who followed American leaders in the Mexican raid or razzia, first planned, years back, by Aaron Burr, at Blennerhassett's Island, in the Mississippi, but failing for lack of men and means, and serving his opponents as an excuse to accuse him of treason against the United States Government? Who are the Fillibusters—the men who join Walker in Nicaragua, and are ready to descend upon Cuba when the time shall come? Of a surety they are not Americans, but the same staple as that root of which grew the bucaniers, the broken men of Europe, with a scattering of "mean whites," men who may not work in the South, even were they disposed. Such men cannot be permanent—cannot make an American nation. They can only live in riot and excess; and, if unsuccessful, they will only die off a little more rapidly than if successful, of cholera and yellow and other fevers, more fatal than the Spanish knife.

That slave-owners should seek to retain their slaves, is not remarkable. Our own West India proprietors did the same, save those who profited by the compensation. American slaveholders are not worse than English. But it is a remarkable thing that the slaveholders should keep those who call themselves freemen in bondage—should dictate all the laws. In numbers, the North would seem capable of walking over the South without impediment; and the evils of slavery to the white man are apparently greater than to the blacks. How is it that the North submits? Where is the ancient courage that should proclaim as with a trumpet voice—

"No slave-hunt on our borders—no pirate on our strand—
No fetters in our Free States—no slave upon our land."

Creeping northward comes the Black Death; and bravely calls out Ralph Waldo Emerson for "committees in permanence." Has the physical vigour run out? With the 25 per cent. lost in weight has 25 per cent. of the mental impulse, the security for honest labour, gone out also?

And whence comes the Southern strength? Has their physical vigour preserved itself while the North has failed; or is there a stronger infusion of European vigour imparted? Domes of the Mitchell and Meagher stamp swell their ranks? Is it that the men of the South are simply landlords, gathering rent, and with ample leisure, while Northern merchants and manufacturers have their thoughts incessantly bent on their desks and workshops, and cannot put their minds into the public service? I would fain it were so, for there would be hope in that; but if it be loss of manly vigour, the days of American greatness are numbered, and only an Asiatic despotism remains, a slave empire, to be absorbed by Russia, or upheld by England and her northern provinces, as is the case with Turkey.

Wheat has, a short time back, been brought direct by ship, without transference of cargo, from the heart of the American corn-growing country into Liverpool harbour. An important fact, which may or may not be followed by successful repetitions, the perils of Anticosti, and Newfoundland fogs, and Atlantic icebergs notwithstanding. There may grow a trade of carrying out English and other agriculturists, and getting return cargoes of wheat from our outlying farms in Michigan, Wisconsin, and Illinois. But we should like to know whether the corn growers deteriorate in the land of lakes and swamps, and fever and ague; whether they most resemble the men of Kent, or the semi-aquatic tribes of Cambridgeshire; whether web-footed like Hollanders, or apple-cheeked like our South Saxons, or eagle-eyed, like the men from the ridges of Yorkshire and Lancashire?

Can they live a long life in a state of healthy enjoyment, and with only occasional drunken bouts, without the diurnal chewing of tobacco, or the imbibition of juleps and gin-slings? One very remarkable habit exists in Americans. Many of them, of most vigorous faculties, emigrate to England, as though the soil and climate were more indigenous to them. Their manufacturing faculty settles down with a Dyer at Manchester. Their banking faculty comes over with a Peabody, with a Hobbs to make the strong boxes, and a Colt to make revolvers to guard them. Their very thieves teach us new modes of plundering hotel guests; and we have their "men about town," knowing everybody and everything, and the sources of their income a mystery to all their acquaintance. All these men recognise their most fitting locality, the soil of elastic health. But it is clear that the great source of American prosperity has been in her large annual importation of full-grown producers, without the cost of transit or "raising." Does she possess the elements for continuing the supply of healthy producers, if by any chance immigration shall cease?

Nothing exists on the earth's surface more beautiful than the form of girlhood in the New England States—Hiram Power's Greek Slave is a type of it. But that beauty partakes of the etiolated attributes of many of our over-delicate and refined English women, born to do no manner of work, and physically cultivated like hot-house plants.

Glad should I be if Emerson could demonstrate satisfactorily that the Anglo-Saxon race does not physically degenerate in the Union; that it holds its own, and does not merely multiply like deteriorated factory workers, but that it increases in mental and physical power. Much may doubtless be done by careful treatment to counteract the effects of climate, but man, like trees and plants, is ever racy of the soil. Soils and climates will grow men with their own attributes, and the question is, whether, by man's care, the soil and climate of the Union can be generally modified so as to grow Englishmen in all their natural vigour, modified in numerous and sufficient localities to give a healthy and vigorous mental and physical frame and tone to the general people, qualities which constitute a nation, and not a mere aggregation of human units.

Time was that the world looked to America as a young giant nursed in the lap of freedom. But that dream is dreamed out, if it be that the delegated lawgivers are true samples of the aggregate staple; if it be that the general faces of America truly represent the general mind of the Union. The instinct of a tricky commerce overlays all the national honour of America—overlaid the chivalrous instinct of freedom during the late war. There was no heart-gush in the general American press, such as would have been the universal impulse of the English press, had it fallen to the lot of America to resist Russian oppression.

It may be that certain portions of the earth's surface are predestined for the growth of the guiders of men, and other portions for their followers; and very gladly would I receive the demonstration that the general American people within the Union belong to the former class, by finding heroic speech the precursor of heroic deed, worthy of all our old and high traditions, arts devoted to human progress, and arms ever wielded in the cause of freedom and the growth of soul.

As a part of the duties of the Society of Arts, it is well to understand that the *manus* comes before the *facture*, and that man, the owner of the "manus," is still more important than the materials he work on, that he, so far as his body is concerned, is a production of the earth, as much as the trees, plants, or lower animals, and of that earth, and its gaseous exhalations, he must be formed and will be formed well or ill accordingly. If he lives where lime is not, he will have gristles, but no bone. If he breathes sulphuretted hydrogen, he will not digest

his food. If he has insufficient food, he will neither have mental nor physical strength, and if he has too much food he will degenerate, as well as if he is confined to one kind of food. To cultivate the mind which a healthy body is competent to maintain, he must be in a position to obtain knowledge and look on beauty in all its varied forms of nature in early life, and of art in later life. The possessor of these things will have health, wealth, —weal,—and a large aggregation of such men and women, will constitute a powerful nation. The absence of these things is poverty, and it must ever be a dependent nation where there are many poor but few rich. The chiefs and leaders, or the state, may advantageously possess enormous wealth, but they should be careful also, so far as possible, to extinguish poverty in the community, from whatever source arising. They should not permit dwellings to be erected in unwholesome localities, and, where erected, they should remove them by Act of Parliament. They should not divide a city into quarters, separating classes and ranks of people; but, on the contrary, should endeavour to mix people of all ranks, not in personal contact, but in mutual supervision, so that the coarse would grow refined, and the refined be (or become) humane, beholding and relieving suffering, or, better still, preventing it. The wealthy, either personally or pecuniarily, would thus become the natural chiefs and leaders of their neighbours. The city circles would be as much bound up as the rural villages. The cities are the centres, the ganglions of intellect; there is no reason why they should not become also the centres of the higher moral virtues. That they are centres of vice is not a necessity, but simply a neglect. Wherever there is a natural gathering of people, there also is a natural centre of instruction. The love of popularity is a very common quality, and it is strange that so very obvious a source of popularity should be so generally neglected. Let the cities be made, as they are capable of being made, pleasant abodes, and the wealthy will flock to them instead of away from them, and a new era may commence. It is clear that a Society of Arts could not flourish in a rural village; and it is clear also that many people do not attend the meetings, because they do not and cannot live in town under its present conditions. There is work enough for the Society of Arts to aid in removing those conditions, by the improvement of humanity, and all that constitutes the growth of humanity.

DEFICIENCY IN THE MADEIRA AND PORT VINTAGES.

The following information on this subject is quoted from a trade circular lately issued by Mr. T. J. Smith, of Oporto:—

"In order to the better understanding of the present anomalous state of the port wine trade, owing to the ravages of the *Oidium*, it may be convenient to trace the course and exhibit the effects of that scourge of the vineyard, from its first appearance at Madeira in the year 1851.

	Pipes.
From the year 1847 to 1850 the annual produce of that island averaged.....	16,915
In 1851 it was reduced by the disease to.....	11,965
1852	1,871
1853	754
1854	187
1855 the vintage was annihilated, producing only	29

"The disease appeared in the Upper Douro in the year 1853, increasing in virulence to the present year, and showing results as fatal as those at Madeira; the port vintage of 1856 being wholly lost to commerce, producing, with the addition of water, only four thousand pipes of a liquid fit only for the meanest purposes of local consumption.

"From the year 1846 to 1852, the annual produce of the Upper Douro averaged 91,533 pipes, after which, from the appearance and spread of the mysterious disease, the produce rapidly declined, the deficiency from the average growth being in the year

	Pipes.
1853, according to official returns.....	16,745
1854	44,285
1855	66,758
1856, estimated at	87,532

Showing the defalcation of the last four years to be no less than215,320

"This enormous deficiency fully accounts for the advance in the price of both wine and brandy at Oporto; that on wine being two hundred and fifty per cent., and on brandy six hundred per cent., since the year 1848.

"Meanwhile, the shipping prices have borne no sort of proportion to the advanced rates which have been established, and must be submitted to at Villa Nova, now the only source of supply, where the stock of merchantable wines is so reduced as to render a large advance on every variety of *genuine* ports an inevitable necessity. Indeed, fine old wines are become so scarce and costly, as to justify the expectation that their price may soon be doubled, as it will require a length of years to create a fresh supply, even after the disease that infests the vineyards should have passed off."

Home Correspondence.

METROPOLITAN SEWAGE.

SIR,—Permit me to say a few words on the sewage question, which I have been led to study from two circumstances. The first was, that residing for some time on the banks of the Thames, in the heart of the City, I was perpetually hearing the remark, "How that scuttle is tarnished, although it was well cleaned yesterday," until, at length, my copper friend was obliged to be greased and stored away. Thinking this matter over, I placed within and without doors, with due precaution, some acetate of lead, and soon found that both specimens became discoloured, and gradually assumed a dark-brown hue. Sulphuretted hydrogen had done this, and I could not avoid the conclusion that the gas so prejudicial to my scuttle, was not very healthy for human beings, and the idea has ever since haunted me, as I walk the streets, and see the pallid children; and I find myself involuntarily exclaiming, "Tarnished lungs and blood."

Again, I had not visited Richmond for many years, until last summer, when, to my extreme astonishment, I found that the clear and bright pleasant river of my boyhood had become a thick churning pool of filth, and with sorrow I retreated towards the park.

Regard to your space will not allow of more than the general principles and bearings of the subject being treated of in this communication.

1. As there never before existed, within so small an area as is covered by London, a population numbering upwards of two millions, it may be safely asserted that the drainage of the metropolis is the most important domestic sanitary question with which any community ever had to grapple.

2. That the Government is incompetent to undertake the matter, is evident from the utter and miserable failure of its attempts to sustain a small army, as soon as the wretched beings were placed at a distance, and in circumstances which required that judgment and forethought should take the place of routine and wasteful extravagance. Nor has the administrative capacity of the Government improved, otherwise the reckless manner in which new unused stores, provided at an enormous ex-

pense, are being disposed of would not be permitted; therefore, the pettish authoritative tone assumed by Sir B. Hall, in his intercourse with the Board of Works, is unbecoming, until the Government can give a better account of its own performances.

3. Nor does the Metropolitan Board of Works appear to be composed of "the right men in the right place;" for, with all good feeling to individuals, it cannot be expected that men who have been engaged in the details of retail business all their lives should be conversant with a great question in which the points to be decided are of a chemical and engineering character; and from this circumstance we may attribute the fact that the sittings of the Board have been occupied either with discussions relating to subordinate matters quite apart from the great object of its appointment, or have assumed the form of stormy advocacy of "my friend" This or That's scheme.

Hence, also, the Board has been driven to the somewhat ridiculous position of submitting to the Government for approval a scheme which had been twice rejected by its own votes.

4. Let us endeavour to place the matter clearly before us. What is required to be done? To remove from a dense population, occupying an area ten miles by six miles, certain inconveniences, viz.:—

A. Ordinary surface water, and extraordinary, as storm water.

B. Waste or refuse matter, as garbage of all kinds, washings of utensils, &c.

C. Solid excrement.

D. Liquid excretions.

The last three are tolerably uniform in the quantity produced; the first, however, being very variable in quantity, and sudden in its fall, provision must be made for its disposal at a maximum rate.

5. Of what do these matters consist, in a chemical point of view?

A. The garbage and solid excrement, being organic matter, are *resolvable* or *convertible* by the atmospheric air into ammonia, sulphur, and phosphorus compounds.

B. Alkaline (ammonia, potash, and soda) salts *already formed*, as in soap washings, liquid excretions, and not precipitable by lime.

C. Phosphates, chiefly in the liquid excretions, and which may be *decomposed* by lime, the phosphoric acid being *precipitated* in combination with the lime.

Hence the importance of bearing in mind in this discussion that we have to deal with *solid* matters *insoluble* in water, in the form in which they are found in the sewers, although *diffused* through a large quantity of water; and matters *dissolved* in the sewer water;—sand may be diffused—but sugar is dissolved in water, as are the ammoniacal salts.

We will now briefly touch upon the schemes which have been proposed to effect the desired object.

6. *The Deodorising Scheme.*—It is proposed to erect works at several points of the metropolis, for the purpose of deodorising the sewage, retaining the solid portion, supposed to be useful for agricultural purposes, and allowing the liquid portion to run off into the stream.

To this proposition several objections may be made.

A. Lime would precipitate a large proportion of the organic matter convertible into ammonia, &c., but not the richest portion of the sewage, viz., the alkaline and ammoniacal salts *existing* ready formed in the washings, liquid excretions, &c., before going into the sewers.

Assuming Mr. Lawes's analysis of the Leicester sewage bricks to be correct, we have 12 per cent. of organic matter thrown down, and less than 1 per cent. of ammonia, the most valuable portion for agricultural purposes, apparently passing on, unaffected by the lime; the water may appear clear and limpid, but this is because the salts of ammonia are *colourless*, and their presence is, therefore, not perceptible to the eye, and being very dilute, they may not affect the taste or smell,

nevertheless, so far as this process is concerned, they escape, and are not rendered of value.

B. The impracticability of dealing conveniently with the immense mass of solid matter which the deodorising process necessitates.

Taking the Leicester case as a guide, it should be observed that, of so little value is the article produced, that, in the short space of 19 months, during which the works have been in operation, 3,000 tons of the produce have been accumulated in the yard of the establishment, which, although it may be commended for "emitting no smell whatever," yet, unfortunately for the theory, the fact that it is there at all only proves that it is not in good odour with agriculturists.

If with a population of 65,000 souls the rate of accumulation is 2,000 tons yearly, with a population of two millions and a half the enormous quantity of 80,000 tons yearly would accumulate an *embarras de richesses*. Of these bricks without straw we could build a pyramid annually.

C. On the deodorising principle, 160,000 tons of lime, it is estimated, would be required every year to be first conveyed to the works, and the resulting manufactured solid article carried away.

In my opinion, this would only be getting rid of one difficulty by introducing another not less serious.

7. *The Irrigation Scheme.*—To this plan two or three fatal objections exist.

A. The sewage is produced daily and hourly, but is only required upon the land intermittingly, at distant seasons, and the most sanguine could not hope to store it until the time of using should come round.

B. Moreover, to adopt the scheme implies arrangement for distribution, and an expensive outlay for pipes over a large district, which must be ready to receive it at all times, and to any extent, or the project is defective in one essential element of working.

Landowners do not appear satisfied that they would be compensated for the necessarily large expenditure; those who have the will may not have the means, and *vice versa*; and how it is to be made a compulsory matter I cannot perceive.

C. Nor have we sufficient evidence to justify the conclusion, that, although it may be advantageous to diffuse a solid manure through water and dilute a strong liquid manure to the degree which the farmer may deem proper according to the wet or dry state of his land, and in that condition apply it to the soil, therefore, it would be a right course or beneficial to flood the land round London with a dilute sewage in addition to the rain which at the very moment might have saturated the ground to the heart's content of the farmer.

The dilute sewage would, of course, come in rainy weather, and the drier the season the more concentrated would be the sewage, the degree of dilution being beyond control, and not optional with the user.

8. *The River Scheme.*—The following objections appear to exist to this project:—

A. Kent and Essex are the lungs of London, and if railway civilities and facilities were increased, they would daily become more populous.

It is another version of David and Uriah. With all its rich enjoyments and luxuries, London cannot devise a better plan for increasing its own comforts than by robbing the small towns and villages on the banks of the Thames of the only advantage they possess,—their one ewe lamb—pure air.

It is proposed to collect all the filth of London and deposit it in heaps at the doors of its weak neighbours.

B. Granting that the sewage would be conveyed so low down the river as not to return even to Gravesend, yet, as it would be discharged in large quantities, it would be thrown up on the shore at Southend, Herne Bay, Margate, and all along the district so much frequented by health seekers from London.

C. This scheme does not embrace any plan for utilising

the sewage; it is at the best a rough mode of removing the nuisance into another locality.

9. As it is only by the thorough agitation and discussion of the subject that the truth can be arrived at, and having stated my objections to the existing proposals, I would suggest one or two points for the consideration of those who have accepted the responsibility of this matter; they receive the emoluments and honours of office, and much praise will accrue if the work be well done, and much blame if they do not succeed.

10. Without reference to cost the best plan for accomplishing the object should be clearly determined, for it is monstrous to suppose that a hundred millions should be thrown away in a war like the last, and that we ought to hesitate for money considerations as to the course to be adopted in a case like the one we are discussing, when once the right thing to be done is plainly laid down. A successful accomplishment of the great task would annually save thousands of valuable lives of all classes, and add materially to the pleasure and health of residents and visitors.

11. The best scheme being determined, the next subject of investigation should be the most economical mode of executing that effective plan.

12. Entertaining these views, I need scarcely say that distance is of secondary consideration, and although when I have spoken of the English Channel as an outlet, the idea has been rather laughingly received, I now find that Sir S. M. Peto proposes to convey the sewage to the German Ocean, a distance greater than any other yet proposed.

13. I differ from him, however, as to the direction in which the sewage should be taken, and its mode of treatment. I should prefer a southerly direction towards the channel, on account of the nature of the country, large tracts, both in Surrey and Sussex, being comparatively worthless, and also for the reasons which follow.

14. The whole of the sewage should be conveyed by covered sewers through Surrey and Sussex, avoiding every large town, if possible; and at the nearest convenient point to London, where waste land can be obtained at a very cheap rate, covered reservoirs should be constructed, each capable of containing the solid sewage of a week, in addition to the total sewage of a day; such reservoirs being so built that the bottom should be below the level of the sewers, the continuation or outlet sewer from the reservoirs being on such a level as might be found advisable, to clear the reservoir of the liquid sewage after settling.

Two reservoirs should be in operation at the same time; thus the pair of reservoirs Nos. 1 and 2 should work together. No. 1 receiving one day's sewage, which should then remain quiescent for 14 or 16 hours, the clear water running off during the last 8 or 10 hours of the second day, during which second day the sewage would be running into No. 2 reservoir, and so on alternately; thus, at the end of a fortnight, the contents of Nos. 1 and 2 reservoirs would be ready for pressure and removal, and the second pair would come into use, and so on in rotation.

The effect of this arrangement would be, that the solid matter would subside by its own gravitation, and the liquid flow onwards.

The outlet sewer should be guarded by strainers, to retain whatever solid matters had not deposited by gravitation.

The strainers might consist of double iron perforated plates, filled in with lumps of charcoal, which charcoal would absorb a large quantity of the soluble salts, and become a valuable manure; and it does not appear to me that these soluble salts could be so well secured in any other way.

Pairs of reservoirs being used in succession, one could be cleared out weekly; the deposit would be true guano, and might be subjected to hydraulic pressure, and in this compacted form could be transported by rail or canal to

all parts of the country; there would be no 50 per cent. of lime to be brought to the works at a large expense, and, when added to the small quantity of fertilizing matter, greatly increasing the weight to be carried away.

Moreover, in the direction I have pointed out, any lime desirable for purifying the works or thinly covering the deposit in the reservoir, could be much more cheaply procured than in Essex.

The now cleansed water might be pumped up, if necessary, and discharged into some of the canals, with whose proprietors arrangements might be made for that purpose, or carried by special conduit to the sea.

All propositions should recognise the twofold character of the question, the chemical and the engineering. The treatment by subsidence, which I propose, is not necessarily connected with a discharge into the Channel, although obviously it could be carried out more cheaply and easily in a thinly-peopled than in a populous district.

In reference to the engineering portion of the subject, I may further remark that the necessity of pumping is admitted in all the plans proposed, and the arithmetical question for decision is, whether, after the arrival of the sewage in the southern part of the metropolis by the natural fall, the annual cost of raising it to such a level as would secure a sufficient fall to the Channel, would not be less than the interest on the outlay for the construction of main intercepting sewers, as on the river plan, or other of the proposed schemes?

For it should be observed that nearly, if not all, the hundreds of miles of sewers already made have their fall towards the south, which is the direction of the natural drainage of London, and the fall of these must be reversed, or several large and very expensive intercepting sewers formed.

I am not insensible to the difficulties attending this or any other scheme; but difficulties vanish before a strong will and clear mind, and works quite as great have been accomplished within our own time, although they may have been principally of an engineering and not of a mixed chemical and engineering character.

Hoping that some thoughts in the foregoing remarks may be the seeds of good result to the public,

I remain, &c.,
W. STONES.

BESSEMER IRON.

SIR,—I see scarcely anything in Mr. Reveley's letter which requires any reply or explanation, being content to leave the correspondence as it stands for every thoughtful mind to draw its own conclusions.

I would merely remark, that Mr. Reveley can know but very little of iron manufacture to express an opinion upon any process, whether as at present practised or now proposed as new, when he introduces such a passage as the following into his last letter:—"Mr. Gladstone speaks of the 'forging process' as if Mr. Bessemer's invention was intended to supersede the necessity of that operation."

The fact is, that I spoke of the "forge process," a part of ironmaking well understood, and very different from the term he gives me, which I never used.

Every tyro in malleable ironmaking knows there are two distinct branches of operation in every ironwork, viz., the forge, with its hammer, rolls, and furnaces, and the mill, with its rolls and furnaces. The first preparatory, the second completing the manufacture. Now Mr. Bessemer told me himself that the effect of his process was to render the first needless, as he prepared the iron for the second; hence the saving of at least 40s. per ton.

Without such assistance the saving of fuel alone would not so reduce the cost, but with such a startling assertion as was named to me, the same became self-evident, and it was this which demanded the thoughtful attention of the trade, and was so important to the public.

Mr. Reveley expresses surprise that Mr. Hall and I should have attended the lecture at the Polytechnic Institution, because the illustration was on a small scale. He must be reminded that I had seen Mr. Bessemer's operation; and as the lecturer had instruction from the patentee, and was also a good theorist in iron-making, what more natural than that we should desire to hear what he said thereon? As I have before stated, Dr. Ryan on the chemical part of the process was beautifully clear, while on the mechanical he could not but be very imperfect, and he gladly received my observations as to some points on which he was altogether wrong.

I can only again express my regret that from so loud and portentous a sound of trumpets, so little real progress has been made in improving, simplifying, and cheapening iron-making, as I at one time expected better things.

I am, &c.,

THOS. M. GLADSTONE.

11, Austin-friars.

P.S.—I see that the trials at the Dowlais Works have turned out a complete failure.

FLOATING BREAKWATERS.

SIR,—Floating breakwaters were invented by Mr. Norburg, a Danish engineer, and employed by him at Revel. Sir Samuel Bentham having noticed that within them the water was perfectly smooth, adopted them for the protection of a sea-wall building at Sheerness, and afterwards proposed a floating breakwater for Plymouth Sound. But in this case he recommended a double row of floats, leaving a space between each row, but covering the interstice by the second row. Since then Captain Warner exhibited a similar breakwater off Brighton—the water within it was smooth, but being of an mechanical form it was finally broken and destroyed.

The chief advantages of floating breakwaters are that they do not oppose an artificial rock to vessels running for shelter to port, while small craft can steer between the floats; their capability of being easily moved about till the most suitable place for them be ascertained; their facility of an entire change of site when desirable; and, lastly, their cheapness.

It would seem that floating breakwaters were particularly suited for such a port as Madras. The anchorage in the roadstead is excellent, but within it a constant surf prevents navigation in any other boats but those of a peculiar construction, not carried by ships.

The model of one of the floats of Sir Samuel Bentham's Floating Breakwater, as proposed for Plymouth Sound, may be seen in the United Service Museum.

I am, &c.,

M. S. BENTHAM.

26, Wilton-place.

Proceedings of Institutions.

CAMBRIDGE.—A lecture on the Science of "Common Things," was delivered, under the joint patronage of the members of the Philo-Union and Mechanics' Institute, at the Town-hall, on Thursday evening, by Mr. J. C. Buckmaster, (of the department of Science and Art). The attendance was not very numerous, and the entertainment could scarcely have been very remunerative to the societies. The lecture consisted of a description and illustration of some of the commonest and simplest phenomena which are met with in the daily walks of life, and the principles of which, the lecturer contended, ought to form part of the elementary education of the country. He explained the principal laws of gravitation, of combustion, and of heat and cold, and performed some experiments on the different gases. He also gave his auditors an insight into the mechanism of the Davy lamp,

the barometer, the thermometer, and the electric-telegraph, as well as of such common objects as the ordinary pump. In conclusion, he said, there were certain things essential in the education of the working-classes especially which constituted the social science of common life, and upon which a lamentable amount of ignorance existed; he alluded to such knowledge as that of social economy, the want of which frequently caused ignorant wives to drive their husbands to the ale-house, instead of making their homes as comfortable as they ought to be. The lecture lasted about an hour in the delivery, and at its conclusion, Mr. Buckmaster was warmly applauded.

HEREFORD.—At the general annual meeting of the subscribers to the Permanent Library, on Monday, the 16th ultimo, the following officers were chosen for the ensuing year:—*President*—Wm. Aston, Esq.; *Librarian*—E. G. Wright, Esq.; *Treasurer*—W. Pulling, Esq.; *Committee*—F. H. Thomas, Esq.; A. C. de Boinville, Esq.; R. C. C. Honiatt, Esq.; H. C. Beddoe, Esq.; Dr. Bull; J. G. James, Esq.; W. Bullock, Esq.; J. T. O. Fowler, Esq.; N. Lanwarne, Esq.; P. Tully, Esq.; W. H. Apperley, Esq.; and J. F. Symonds, Esq.; *Sub-Librarian*—Mr. Wemyss. In addition to the permanent character of this Institution, a proposal to hire books of current literature, instead of purchasing them, was adopted at this meeting. By this plan, the sphere and funds of the Institution will be economised, and additional accommodation afforded to those members who are desirous of light reading. Forty volumes, exchangeable at pleasure, will be received at one time, from an extensive library in London. An ample and ever-changing supply of books will thus be secured for the most expeditious readers. In consequence of the crowded state of the Permanent Library, additional room for the regularly-increasing number of books has become necessary. That object has, at present, been effected by the erection, in the centre of the room, of a book-stand, capable of containing nearly one thousand volumes. When the stand shall have received its complement of books, this long-established Institution will present an array of about eight thousand volumes, in every department of literature.

WENLOCK.—On Friday, the 5th ult., the fifteenth anniversary of the Agricultural Reading Society was held at Wenlock, M. G. Benson, Esq., president of the Society, in the chair. W. P. Brookes, Esq., honorary secretary; George Burd, Esq., treasurer; Rev. W. H. Wayne, Rev. R. R. G. More, Walter Mosely, Esq., Rev. N. Heywood, W. A. James, Esq., Mr. Phillips, Mr. Horton, Mr. Patten, Mr. Martin, Mr. G. Moreton, &c., and other gentlemen being present. Mr. Brookes read the report, which stated that there has been an increase in the number of subscribers, both to the reading-room and library, the total amount received being £32 10s. more than in the previous year. The number of volumes presented to the Institution during the past year is 62, and of purchased 38, making together an addition of 100 volumes. Two rooms have been added to the Society's Building. A class for drawing has already been established on the government plan, in connexion with the Coalbrookdale, Broseley, and other Institutions, and the number of pupils already on the list is 30. The committee called the attention of the members to the recent proposal of the Society of Arts to hold annual examinations of students of these Institutions, to reward superior attainments by prizes, or give certificates for proficiency in various branches specified, and they trust that these offers will induce the junior members of this Society to form themselves into classes and to contend for the prizes. The report of the Working Man's Reading Society, in connection with this Institution, states that the present number of members is 37. The annual dinner took place at half-past three o'clock, at which there were upwards of ninety present. M. G. Benson, Esq., occupied the chair. Mr. Gaskill, M.P., the Rev. W. H. Wayne, and other gentlemen spoke on the occasion.

MEETINGS FOR THE ENSUING WEEK.

- MON.** London Institution, 7. Dr. John Tyndall, "On the Nature and Phenomena of Light."
Architect, 8.
Geographical, 8½. I. Lieut. W. Chimmo, R.N., "Remarks during the Search in the Torch Steamer for the North Australian Expedition, under Mr. Gregory." II. Admiral Sir Charles Elliot, "On the Exploration of the River Orinoco." III. Mr. Thomas Banister, "Proposed Railroad through North America, from Vancouver Island to Hudson Bay."
- TUES.** Syro-Egyptian, 7½. Mr. W. F. Ainsworth, "On the Euphrates Valley Route."
Civil Engineers, 8. Mr. F. R. Window, "On Submarine Electric Telegraphs."
Med. and Chirurg, 8½.
Zoological, 9.
- WED.** Literary Fund, 3.
London Institution, 3. Professor Rymer Jones, "On Vivaria and their Inhabitants."
Society of Arts, 8. Mr. Chief Justice Temple, "On Honduras, its History, Trade, and Natural Resources."
Graphic, 8.
Microscopical, 8.
Archæological Association, 8½.
Ethnological, 8½.
- THURS.** Philosphical Club, 5½.
London Institution, 7. Dr. R. E. Grant, "On the Natural History of Extinct Animals."
Antiquaries, 8.
Philological, 8.
Royal, 8½.
Asiatic, 9.
- SAT.** London Institution, 3. Mr. T. A. Malone, "On Experimental Physics, chiefly in Relation to Chemistry."
Medical, 8.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[From Gazette, January 2nd, 1856.]

- Dated 16th December, 1856.*
2976. Charles Frédéric Vasserot, 45, Essex-street, Strand—Preserving salmon, trout, and other fish. (A communication.)
2978. William Frederick Thomas, Newgate-street—Improvements in sewing machines.
2980. Frederick William Gerhard, 4, Trafalgar-square—Improved means of obtaining aluminium metal, and the adaptation thereof to the manufacture of certain useful articles.
2982. William Gossage, Widnes, Lancashire—Improvements in the manufacture of sulphuric acid, and in the construction of apparatus used for such manufacture.
2984. Alfred Vincent Newton, 66, Chancery-lane—Improvements in printing presses. (A communication.)
Dated 17th December, 1856.
2986. Peter Armand le Comte de Fontainemoreau, 4, South-street, Finsbury—Improvements in obtaining motive power. (A communication.)
2988. John Platt, Oldham, Lancashire—Improvements in mules for spinning. (A communication.)
2989. William Edward Newton, 66, Chancery-lane—An improvement in the manufacture of table knives. (A communication.)
2990. Frederick Levick, junr., and John James, Cwm Celyn and Blaia Iron Works, Monmouthshire—Improvements in the mode of utilising the waste gases of blast furnaces.
2991. John Hall Brook Thwaites, Bristol—A new or improved machine or apparatus for holding postage or receipt stamps, and applicable wholly or in part to other similar purposes.
2992. Charles Cowper, 20, Southampton-buildings, Chancery-lane—Certain improvements in electro-plating.
2994. Vincent Louis Cazimir Renou, Jersey—An improvement in the manufacture of spirit when rice is used.
Dated 18th December, 1856.
2996. John Elce and Samuel Hartley, Manchester—Improvements in machinery for moulding.
2998. John Draper, Chiswell-street, Finsbury—Improvements in apparatus for grating and crushing salt and sugar.
3000. Joseph Bower, Hunslet, near Leeds—An improvement in treating animal matters in preparing them to be used for the manufacture of manure.
3002. Charles Fay, Manchester—Improvements in railway carriages and breaks.

3004. François Donny, Ghent—Improvements in the manufacture of lamps.

Dated 19th December, 1856.

3006. Louis Beaver, Manchester—Improvements in machinery for propelling vessels.
3008. Robert Hyde Greg and Henry Russell Greg, Manchester, and James Hope, Reddish—Certain improvements in machinery or apparatus for polishing or finishing yarns or threads.
3010. James Penny and John Booth, Heckmondwike, Yorkshire—Improved machinery for washing, cleansing, and drying grain.

Dated 20th December, 1856.

3014. John Edridge, Birmingham—Improvements in the manufacture of hair pins, shawl and other dress pins, parts of which improvements are also applicable to the manufacture of clasps and similar dress fastenings.
3016. Captain George Alexander Harrison, 79th Highlanders—Improvements in breech-loading fire-arms.
3018. Thompson Newbury, Taunton, Massachusetts, U.S.—Improved machinery for making screws.

Dated 22nd December, 1856.

3020. Theodore Dethier, Pimlico—An improved knife cleaner.
3022. William Mill, Birmingham—Improvements in joining bands, in connecting fastenings to bands, and in attaching bands to articles requiring the same.
3024. Frederick Sampson, Gordon-street, Bradford, Yorkshire—Improvements in apparatus employed in singeing fabrics.

INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

3027. Daniel West, 17, Egremont-place, New-road—An improvement in presses constructed to operate by a combination of iron levers, which presses are employed to compress bales of cotton, hemp, wool, and other articles of merchandise.—22nd December, 1856.
3056. Jules Henri Etienne Mareschal, Paris—Improvements in hydraulic presses.—24th December, 1856.
3060. Charles Sylvester Rostaing, Dresden—Improvements in preparing and combining metallic substances for the production of colours, and in manufacturing the same.—26th December, 1856.
3076. George White, 5, Laurence Pountney-lane, Cannon-street—An improved poultice. (A communication.)—27th December, 1856.

WEEKLY LIST OF PATENTS SEALED.

January 2nd.

1570. Thomas Chandler.
1574. Louis Cornides.
1575. Edwin Travis and Joseph Louis Casartelli.
1579. James Alexander Manning.
1597. Edward Charles Healey and Edward Ellis Allen.
1636. Stephen Martin Saxby.
1651. John Avery.
1686. Alfred Vincent Newton.
1702. William Noton.
1738. John Brayshay.
1810. William Edward Newton.
1964. Frederick Albert Gatty.
1976. Marc Antoine François Menons.
2169. Robert Mushet.
2290. Peter Armand le Comte de Fontainemoreau.
2578. Samuel Middleton.
2584. Joshua Murgatroyd.

January 6th.

1602. Joseph Henry George Wells.
1603. Joseph Henry George Wells.
1610. Abraham Herts.

1620. Ward Holroyd and William Noble.

1622. Timothy Jerome.
1642. Jean Baptiste Desire Chevalier and Narcisse Rabouin O'Sullivan.
1645. Benoit Frederic Ortet.
1671. James Ford and P. Knowles.
1681. Henry Bragg.
1694. Peter Hubert Desvignes.
1696. William Beevers Birkby.
1703. James Ryder and Daniel Bentley.
1710. Edward William Young.
1731. Elias Weisskopf.
2069. Ralph Reeder.
2076. Sidney Wesley Park and Edgar Stimpson Ells.
2156. Calvin Kline.
2544. Charles De Jongh.
2586. Ethan Campbell.
2614. William Henry Olley.
2616. Peter Cato, John Miller, junr., and John Audley.
2619. Henry Dircks.
2627. George Bertram and Wm. Mc Niven.
2629. William Porter.

PATENTS ON WHICH THE THIRD YEAR'S STAMP DUTY HAS BEEN PAID.

December 30th.

3039. Julian Bernard.
10. David Kennedy.
17. Julian Bernard.
38. William Edward Newton.

December 31st.

22. Edward Schischkar and F. Grace Calvert.
26. Leon Joseph Pomme.

January 1st.

3. Alfred Dawson.
27. John Mason and Leonard Kaberry.
30. Henry Hind Edwards.

January 2nd.

8. Henry Lee Corlett.

January 3rd.

11. James Stovold.
29. David Hulett.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Proprietors' Name.	Address.
3927	Jan. 2.	Improved Police Lantern	Farwig and Bullock	16, Rupert-street, Haymarket.
3928	" 6.	The Signaliser	Wm. Gascoigne Shaw	Kingsland.
3929	" 7.	Stove and Guard	Henry Bamford	Uttoxeter.